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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/589,199  
Filing Date: June 29, 2007  
Appellant(s): SANG ET AL.

\_\_\_\_\_  
Suzanne C. Walts & Gary R. Edwards  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 09/18/2011 appealing from the Office action mailed 07/06/2011.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

Claims 1-21 are pending. Claims 1-12 and 21 are under appeal. Claims 13-20 are withdrawn from further consideration.

**4) Status of Amendments After Final**

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the

subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

#### **WITHDRAWN REJECTIONS**

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner:

**Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horii et al EP 0 456 931 (Horii).**

#### **(7) Claims Appendix**

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

#### **(8) Evidence Relied Upon**

US 6,524,076	Konishi	04-25-2001 Filed
US 2,856,234	McNair et al	05-28-1952 Filed
US 6,739,574	Simon	11-22-2000 Filed
US 5,433,365	Davies	09-08-1992 Filed
EP 0 456 931	Horii et al	09-10-1990 Filed

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

**Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horii et al EP 0 456 931 (Horii) in view of Konishi US 6,524,076 (Konishi).**

Regarding claim 1, Horii discloses Coanda spiral flow device (Title), a suction intake (Fig 2 part #1), an outlet (Fig 2 part # 4), a fluid channel extending between the suction intake and the outlet (Fig 2), a drive flow inlet (Fig 2 part # 11), in fluid flow communication with the fluid channel (Fig 2), discharge slit (Fig 2 part #5), surrounded by larger bore (compared to outlet #4) surface (part # 6 Fig 2); by adjusting the threads via the coupling flanges (part # 3 and #9 Fig 2) the clearance of slit (part #5) is adjusted (col 3 lines 25-30).

Regarding the claim recitation "adjusts the flow cross section", Horii discloses difficulty in the conventional design to adjust the slit to an accuracy of 0.01 mm in the assembly operation (page 2 left col, line 46); however, the improved design of forming the sub assemblies A, B and C (Fig 2) allows such an accuracy and permits the occasional assembly of units at the job site (page 3 left col, line 37). Consistent with the Horii teaching, slits are adjustable slits; hence, capable of adjustment of flow cross section.

Horii teaches the slip operation to maintain the required pressure. Horii does not explicitly teach the operation via electronic control unit that adjusts the flow.

However, Konishi while disclosing a control valve, teaches the electronic control unit that controls the flow rate of the fluid (claim 4). Konishi further teaches that the fluid flow can be controlled by an electronic control unit that takes input from sensors and operation of electronic control unit and pressure control is performed by the sensor input to control or maintain a required flow (Claims 4, 5, 6, 7 and Fig 1). Konishi further teaches that by maintaining the sufficient flow rate by electronic control saves energy and produces high reliability (col 2 line 55).

Thus, at the time of invention it would have been obvious to a person of ordinary skill in the art to control the slit operation for adjusting flow (Horii) by using an electronic control unit (Konishi). One of ordinary skill in the art, at the time of the invention would have been motivated to do so because the process of electronic control makes the system energy efficient and produces higher reliability.

Regarding the claim limitation "after assembly of the Coanda flow amplifier", it is noted that the "Coanda flow amplifier" is an apparatus. It is further noted that the adjustment of the flow cross section so that the discharge slit does not exceed a critical ratio is the operational characteristics of the apparatus when the apparatus is in operation. The as-assembled state of the apparatus is not necessarily the operational state of the apparatus. The adjustment of the flow cross section by an electronic control unit is expected to take place during the operation of the apparatus after the assembly. Therefore, prior art anticipates the claim limitation.

Regarding the claim recitation of intake pressure does not exceed a critical pressure ratio, it is noted that functionality of the slit whether operated manually or

electronically is to maintain the required pressure. In MPEP: 2114[R-1] Apparatus Functional Language: APPARATUS CLAIMS MUST BE STRUCTUR-ALLY DISTINGUISHABLE FROM THE PRIOR ART. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Therefore, the slit control whether manual or electronic is capable of providing the recited functionality.

Regarding claim 2, Horii further discloses adjustments of the threads via the coupling flanges (part # 3 and #9 Fig 2) the clearance of slit (part #5) is adjusted (col 3 lines 25-30). Consistent with the Horii teaching, at the time of invention it would have been obvious to a person of ordinary skill in the art that the slits are adjustable slits; hence, capable of adjustment of flow cross section and maintain the pressure requirements. Hence, prior art anticipates the claim limitation.

**Claims 2 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horii in view of Konishi and further in view of McNair et al US 2,856,234 (McNair).**

Regarding claim 2, teachings of Horii in view of Konishi have been delineated in the 103(a) rejection of claims 1 above.

Although Horii in view of Konishi discloses the discharge slit, and makes it adjustable by the threaded coupling flanges, Horii in view of Konishi does not explicitly teach the complete closure of the slit.

However, McNair while disclosing a proportioning device, teaches a liquid proportioning device (Title, examiner considers liquid to be a "fluid"), a drive-flow

discharge slit (Fig 3 part # 28'), a fluid conduit (Fig 3 part # 22), variably adjustable (Fig 3 part # 28, #26), can be completely closed (Fig 3 part # 28, #26). McNair further teaches the complete opening or closing for the automatically effecting the controlled proportioning function and supply of chemical substances to a flowing stream of liquid vehicle (col 3 line 2).

Thus, at the time of invention it would have been obvious to a person of ordinary skill in the art to control the slit operation for adjusting flow by an electronic control unit (Horii, Konishi) using complete closing of the slits (McNair). One of ordinary skill in the art, at the time of the invention would have been motivated to do so because the process of complete closing or opening facilitates the dispensing of fluids with controlled mechanical admixtures.

Regarding claim 21, McNair discloses variably adjustable (Fig 3 part # 28, #26), can be completely closed (Fig 3 part # 28, #26). Regarding the claim recitation "during operation of the Coanda flow amplifier", Horii discloses difficulty in the conventional design to adjust the slit to an accuracy of 0.01 mm in the assembly operation (page 2 left col, line 46); however, the improved design of forming the sub assemblies A, B and C (Fig 2) allows such an accuracy and permits the occasional assembly of units at the job site (page 3 left col, line 37). Consistent with the Horii teaching, slits are adjustable slits; hence, capable of adjustment during the operation.



**Claims 3, 4, 5, 10, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horii in view of Konishi and further in view of Simon US 6,739,574 (Simon).**

Regarding claims 3, 4, teachings of Horii in view of Konishi have been delineated above in the 103 (a) rejection of claim 1 above.

Although Horii in view of Konishi disclose the suction and outlet of the Coanda device and the structure of the device, Horii in view of Konishi does not explicitly disclose the flow guiding element.

However Simon while disclosing a fluid valve system, teaches a piezo electric valve (Title) for fluid valves (col 1 line 4), control fluid flow through an orifice (col 1 line 15, Figs 4 'on' and 'off'; it is noted that the flow guiding element due to state of 'on' and 'off'), along a longitudinal axis (Fig 1), in a direction opposite to the fluid flow direction in the fluid channel ("transverse" direction col 2 line 19). Simon further teaches the flow control through an orifice (Abstract) that is helpful in maintaining the flow cross section (Fig 4, 'on' and 'off' states).

Thus, at the time of invention it would have been obvious to a person of ordinary skill in the art to control the slit operation for adjusting flow by an electronic control unit (Horii, Konishi) using flow guiding elements (Simon). One of ordinary skill in the art, at the time of the invention would have been motivated to do so because the process of using flow guiding elements facilitates the flow across the channel that is controlled through the orifice.

Regarding the claim recitation of first housing section and the upstream face, it is noted that the piezoelectric device is attachable, per the Simon disclosure (col 1 lines 50-54), to any orifice where the fluid control is required. Horii discloses the suction and the discharge of the Coanda device. Thus, at the time of invention, it would be obvious to a person of ordinary skill in the art to attach the flow control piezoelectric device on the discharge of the Coanda device and form the additional housing the 3rd housing or even multiple housings.

Regarding claim 5, Simon discloses an enclosure that surrounds the flow guiding elements (Fig 1 and 2).

Regarding claim 10, Simon discloses an actuating element (Fig 3 part # 1a and 1b). Actuating means, as disclosed by Simon, affects the axial displacement.

Regarding claim 11, Simon discloses piezoelectric actuator (col 1 lines 5—55, Fig 4).

Regarding claim 12, Simon discloses the 'off' position in Fig 4 (it is noted that 'off' position is the inactive state) and further discloses the direction opposite to the fluid flow. Regarding the recitation "resiliently", it is noted that 'pre loading force' (Fig 3) makes the system resilient to maintain the actuation motion (Fig 4).

**Claims 6, 7, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horii in view of Konishi and Simon and further in view of Davies US 5,433,365 (Davies).**

Regarding claim 6, teachings of over Horii in view of Konishi and Simon have been delineated above.

Although Horii in view of Konishi and Simon disclose the suction, exhaust and flow control housing, Horii in view of Konishi and Simon does not disclose the sealing means and the housing attached to the sealing means.

Davies discloses the fluid nozzle device (Title), sealing means (Fig 1A part # 118 'o' rings), distancing rings (Fig 1A, 1B and 1C part # 145, 149) and expansion space (Part # 13), sealing element is in the groove (part # 118), circumferential surface of the flow path (Fig 1A, 1B and 1C part # 145, 149). Davies further teaches sealing devices with nozzle have the advantage of dynamic flow guides (col 2 line 45) and maintain expansion space (Fig 1a).

Thus, at the time of invention it would have been obvious to a person of ordinary skill in the art to control the slit operation for adjusting flow by an electronic control unit using flow guiding elements (Horii, Konishi and Simon) and utilizing the sealing means in a groove on the circumference (Davies). One of ordinary skill in the art, at the time of the invention would have been motivated to do so because the process of using sealing helps to maintain sealed joints with the benefit of expansion space.

Regarding claims 7, 8 and 9, Horii discloses the suction and the discharge of the Coanda device and Simon teaches housing that encloses the actuators with the

expansion space as disclosed by Davies. It would be obvious to a person of ordinary skill in the art at the time of invention to attach the flow control piezoelectric device on the discharge of the Coanda device and form the additional housing the 3rd housing or even multiple housings.

**(10) Response to Argument**

**VII A. Claims 1 and 2 are Not Obvious over Horii under 35 U.S.C. § 103(a)**  
(page 11)

**Examiner respectfully submits** that the rejection has been withdrawn.

Therefore, in view of the withdrawn rejection, the related arguments are now considered moot.

**VII B. Claims 1 and 2 are Not Obvious over Horii and Konishi under 35 U.S.C. § 103(a)** (page 19)

**Claim 1** (page 19)

**Appellant argues** that Horii does not teach or suggest a Coanda flow amplifier that comprises, inter alia, "an electronic control unit that adjusts the flow cross section of the drive-flow discharge slit after assembly of the Coanda flow amplifier such that a pressure ratio between an output pressure of the drive flow that leaves the drive-flow discharge slit and an intake pressure of the drive flow that enters the drive-flow discharge slit does not exceed a critical pressure ratio," as recited in claim 1. (page 19)

**In response, examiner respectfully submits** that examiner agrees with the appellant's assertion that Horii does not teach an electronic control unit; however, examiner respectfully submits that the deficiency of Horii is cured by the secondary art (Konishi) cited by the examiner. Specifically, Konishi while disclosing a control valve, teaches the electronic control unit that controls the flow rate of the fluid (claim 4, Konishi). Konishi further teaches that the fluid flow can be controlled by an electronic control unit that takes input from sensors and operation of electronic control unit and pressure control is performed by the sensor input to control or maintain a required flow (Claims 4, 5, 6, 7 and Fig 1, Konishi). Konishi further teaches that by maintaining the sufficient flow rate by electronic control saves energy and produces high reliability (col 2 line 55). Thus, at the time of invention it would have been obvious to a person of ordinary skill in the art to control the slit operation for adjusting flow (Horii) by using an electronic control unit (Konishi). One of ordinary skill in the art, at the time of the invention would have been motivated to do so because the process of electronic control makes the system energy efficient and produces higher reliability.

Regarding the appellant's argument of "critical pressure ratio", examiner respectfully submits that the independent claim 1 is drawn to an apparatus (a Coanda flow amplifier) and the recitation of critical pressure ratio refers to the functionality of the electronic control unit. It is submitted, "While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function" MPEP 2114[R-1]. It is further

noted that Konishi teaches the structure, an electronic control unit, which is considered capable of, respectfully submitted, maintaining a critical pressure ratio.

**Appellant argues** that Horii teaches away from the quoted claim feature.

Further, Konishi fails to remedy the deficient teachings of Horii. (page 19).

**In response examiner respectfully submits** that Horii teaches an apparatus (Coanda Flow Amplifier) that is totally manual since the slit (part #5, Fig 2) is assembled and adjusted manually. Konishi teaches an electronic control unit that controls the flow rate of the fluid in accordance with the signal from a speed sensor (claim 4, Konishi). Therefore, examiner respectfully submits that Konishi cures the deficient teachings of Horii.

Claim 2 (page 20)

**Appellant argues** that Horii does not teach or suggest that "the drive-flow discharge slit can be completely closed," as recited in claim 2. On the contrary, as discussed above, Horii teaches away from the quoted claim feature. Further, Konishi fails to remedy the deficient teachings of Horii. (page 20)

**In response examiner respectfully submits** that Horii teaches an apparatus (Coanda Flow Amplifier) that is totally manual since the slit (part #5 Fig 2) is assembled and adjusted manually. Konishi teaches an electronic control unit that controls the flow rate of the fluid in accordance with the signal from a speed sensor (claim 4, Konishi). An electronic control unit is capable of completely opening or closing the slit. Therefore, examiner respectfully submits that Konishi cures the deficient teachings of Horii. Therefore, examiner respectfully submits that claim 2 is unpatentable.

**C. Claims 2 and 21 are Not Obvious over Horii, Konishi, and McNair under 35 U.S.C. § 103(a)** (page 20)

Claim 2 (page 20)

**Appellant argues** that it would not have been obvious to completely close the Coanda slit 5 of Horii, because this would prevent the Coanda spiral flow unit from achieving the desired spiral flow. (page 21)

**In response, examiner respectfully submits** that the dependent claim 2 is drawn to "the Coanda flow amplifier according to claim 1, wherein the drive-flow discharge slit can be completely closed" (instant claim 2). Although Horii in view of Konishi discloses the discharge slit, and makes it adjustable by the threaded coupling flanges, or alternatively, by the electronic control, Horii in view of Konishi does not explicitly teach the complete closure of the slit. However, McNair while disclosing a proportioning device, teaches a liquid proportioning device (Title, it is noted that liquid is considered to be a 'fluid'), a drive-flow discharge slit (Fig 3 part # 28'), a fluid conduit (Fig 3 part # 22), variably adjustable (Fig 3 part # 28, #26), can be completely closed (Fig 3 part # 28, #26). McNair further teaches the complete opening or closing for the automatically effecting the controlled proportioning function and supply of chemical substances to a flowing stream of liquid vehicle (col 3 line 2). Thus, one of ordinary skill in the art, at the time of the invention would have been motivated to do so because the process of complete closing or opening facilitates the dispensing of fluids with controlled mechanical admixtures.

Claim 21 (page 21)

**Appellant argues** that it would not have been obvious to modify Horii to make the flow cross section of the Coanda slit 5 variably adjustable during operation of the Coanda flow amplifier, because the entire Coanda spiral flow unit is designed to achieve one specific slit clearance that does not change after assembly; therefore, claim 21 is patentable over Horii, Konishi, and McNair at least by virtue of its dependence on claim 1, as well as its additionally recited features. (page 21)

**In response, examiner respectfully submits** that regarding the claim recitation "during operation of the Coanda flow amplifier", Horii discloses difficulty in the conventional design to adjust the slit to an accuracy of 0.01 mm in the assembly operation (page 2 left col, line 46); however, Horii teaches that the improved design of forming the sub assemblies A, B and C (Fig 2) allows such an accuracy and permits the occasional assembly of units at the job site (page 3 left col, line 37). Consistent with the Horii teaching, slits are adjustable slits; hence, capable of adjustment during the operation. Additionally, Konishi teaches the electronic control of the slit and McNair discloses variably adjustable (Fig 3 part # 28, #26), can be completely closed (Fig 3 part # 28, #26). Therefore, examiner respectfully submits that claim 21 is not patentable over Horii, Konishi, and McNair.



**D. Claims 3-5 and 10-12 are Not Obvious over Horii, Konishi, and Simon under 35 U.S.C. § 103(a)** (page 22)

**Appellant argues** that Horii teaches away from the quoted claim feature ("an electronic control unit"); additionally, Konishi and Simon fail to remedy the deficient teachings of Horii. Appellant further argues that claims 3-5 and 10-12 are patentable over Horii, Konishi, and Simon at least by virtue of their dependencies on claim 1, as well as their additionally recited features. (page 22)

**In response, examiner respectfully submits** that Simon teaches a piezo electric valve (Title) for fluid valves (col 1 line 4), controls fluid flow through an orifice (col 1 line 15, Figs 4 'on' and 'off'; it is noted that the flow guiding element due to state of 'on' and 'off'), along a longitudinal axis (Fig 1), in a direction opposite to the fluid flow direction in the fluid channel ("transverse" direction col 2 line 19). Simon further teaches the flow control through an orifice (Abstract) that is helpful in maintaining the flow cross section (Fig 4, 'on' and 'off' states). Therefore, one of ordinary skill in the art, at the time of the invention would have been motivated to use the flow guide elements because the process of using flow guiding elements facilitates the flow across the channel that is controlled through the orifice. Examiner has already explained in the Section VII B that Konishi teaches the electronic control unit that controls the flow rate of the fluid (claim 4). Konishi further teaches that the fluid flow can be controlled by an electronic control unit that takes input from sensors and operation of electronic control unit and pressure control is performed by the sensor input to control or maintain a required flow (Claims 4, 5, 6, 7 and Fig 1). Konishi further teaches that by maintaining the sufficient flow rate by

electronic control saves energy and produces high reliability (col 2 line 55). Therefore, Konishi cures the Horii deficiency. Simon further cures the combined deficiency of Horii and Konishi. Therefore, examiner respectfully submits that claims 3-5 and 10-12 are unpatentable over Horii, Konishi, and Simon.

**E. Claims 6-9 are Not Obvious over Horii, Konishi, Simon, and Davies under 35 U.S.C. § 103(a)** (page 23)

**Appellant argues** that Horii does not teach or suggest a Coanda flow amplifier that comprises "an electronic control unit" and Konishi, Simon, and Davies fail to remedy the deficient teachings of Horii; therefore, claims 6-9 are patentable over Horii, Konishi, Simon, and Davies at least by virtue of their dependencies on claim 1, as well as their additionally recited features. (page 23)

**In response, examiner respectfully submits** that examiner agrees with the appellant's assertion that Horii does not teach or suggest a Coanda flow amplifier that comprises "an electronic control unit"; however, Konishi cures the deficiency of Horii Konishi teaches the electronic control unit that controls the flow rate of the fluid (claim 4, Konishi). Davies discloses the fluid nozzle device (Title), sealing means (Fig 1A part # 118 'o' rings), distancing rings (Fig 1A, 1B and 1C part # 145, 149) and expansion space (Part # 13), sealing element is in the groove (part # 118), circumferential surface of the flow path (Fig 1A, 1B and 1C part # 145, 149). Davies further teaches sealing devices with nozzle have the advantage of dynamic flow guides (col 2 line 45) and

maintain expansion space (Fig 1a). One of ordinary skill in the art, at the time of the invention would have been motivated to utilizing the sealing means in a groove on the circumference because the process of using sealing helps to maintain sealed joints with the benefit of expansion space. Hence, Davies cures the deficiency of Horii, Konishi and Simon. Therefore, examiner respectfully submits that claims 6-9 are unpatentable over Horii, Konishi, Simon, and Davies.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Examiner, Art Unit 1732

/Melvin Curtis Mayes/  
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